

D.G.E -HR.SEC. EXAMINATION MARCH - 2014

REGISTER NUMBER

606676



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EXAMINATION CENTRE : 5616 ST CLUNEY MHSS NEYVELI

GROUP CODE : 103

SUBJECT : 009 BIOLOGY E

APPLICATION NO : 1010636

APPLIED FOR : ScanCopy



SUB CODE : 009 MEDIUM : E

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(C)

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(B)

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BUNDLE NO

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SCRIPT NO

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SUBJECT :

009 BIOLOGY E



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Bundle No

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Marks in Words

Marks in Figures

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Designation

Number

Signature

Designation	Number	Signature
A.E		
S.O		
C.E		
M.V.O		

AE 1395

126-01-08

58

அரசுத் தேர்வுகள் துறை

Script No.

08

DEPARTMENT OF GOVERNMENT EXAMINATIONS

Total Marks

75

HSE BIOLOGY

விடைத்தாள் திருத்துவோர் நிறைவு செய்ய வேண்டியவை

FOR THE USE OF EXAMINERS ONLY

வினாவாரியாக மொத்தம்						பக்கவாரியாக மொத்தம்					
Questionwise Total						Pagewise Total					
வினா எண் Q.No	மதிப் பெண்கள் Marks	வினா எண் Q.No	மதிப் பெண்கள் Marks	வினா எண் Q.No	மதிப் பெண்கள் Marks	பக்க எண் Page No	மதிப் பெண்கள் Marks	பக்க எண் Page No	மதிப் பெண்கள் Marks	பக்க எண் Page No	மதிப் பெண்கள் Marks
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14	1	29	5	44		14	5	29		44	59
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மொத்தம் Total	17	மொத்தம் Total	37	மொத்தம் Total	20	மொத்தம் Total	64	மொத்தம் Total	10	மொத்தம் Total	

வினாவாரியாக மொத்தம்

Question-wise Grand Total

74 75

பக்கவாரியாக மொத்தம்

Page-wise Grand Total

74 75

HSE BIOLOGY

தேர்வு எழுதுபவர் செய்யக்கூடியவை மற்றும் செய்யக்கூடாதவை

Do's & Dont's for Candidates

வ.
எண்.

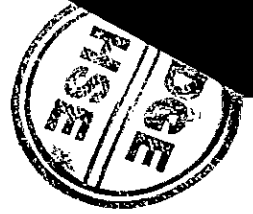
செய்க
DO's

1. முகப்புச்சீட்டில் உரிய இடத்தில் கையொப்பமிட வேண்டும்.
Put your signature in the Top sheet in the appropriate place.
2. விடைத்தாளில் ஒரு பக்கத்திற்கு 20 முதல் 25 வரிகள் வரை எழுதவேண்டும்.
Write 20 to 25 lines in a page.
3. விடைத்தாளின் இருபுறத்திலும் எழுத வேண்டும்.
Write answers in both sides of paper.
4. செய்முறைகள் யாவும் விடைத்தாளின் பகுதியில் இடம் பெறவேண்டும்.
All rough works must be done on the lower part of the page.
5. வினா எண் தவறாமல் எழுத வேண்டும்.
Write the question numbers without fail.
6. இரு விடைகளுக்கிடையே இடைவெளி விட்டு எழுத வேண்டும்.
Leave space between two answers.
7. வினாத்தாளின் வரிசை A or B எழுத வேண்டும்.
Write the question paper A or B booklet series.
8. விடைத்தாளில் நீலம்/கருப்புமை கொண்ட பேனாவால் விடைகளை தெளிவாக எழுத வேண்டும்.
Answers must be legibly written either in Blue or Black ink pen.
9. விடைத்தாளில் எழுதாத பக்கங்களில் குறுக்குக்கோடு இடவேண்டும்.
Cross the unwritten pages.

வ.
எண்.

செய்யற்க
Dont's

1. வினாத்தாளில் எந்தவித குறியீடும் இடக்கூடாது.
No marking in the question paper.
2. விடைத்தாளை சேதப்படுத்தக் கூடாது.
Don't damage the answer paper.
3. விடைத்தாளில் எந்த ஒரு பக்கத்திலும் தேர்வு எண்/பெயர் எழுதக்கூடாது.
Don't write name / Register Number in any page of the answer book.
4. வண்ணக்கலர் கொண்ட பேனா/ பென்சில் எதையும் பயன்படுத்தக் கூடாது.
Don't write with sketch / colour pencils.
5. விடைத்தாள் கோட்டின் இடது பக்கத்தில் எழுதக்கூடாது.
Don't write on the margin.
6. விடைத்தாள் புத்தகத்தின் எந்த தாளையும் கிழிக்கவோ/நீக்கவோ கூடாது.
Don't tare / remove any page from the answer book.



SECTION - A

1. b) cohorts ✓

2. a) *Euphorbia tirucalli* ✓

3. c) 1978 ✓

4. c) monocot root ✓

5. b) seed coat of *Pinus* ✓

6. a) B-chromosome ✓

7. b) 7:1:1:7 ✓

8. a) Tea mays ✓

9. d) Totipotency ✓

10. c) three ✓

11. c) Epiphyte ✓

12. b) *Aegle marmelos* ✓

13. a) *Cercospora personata* ✓

14. d) Ethylene ✓

SECTION - B

15.

Binomial Nomenclature :

(3)

(i) The system of naming plants with two names is called

Binomial Nomenclature.

(ii) The first name is called generic name and second name is called species name.

(iii) Eg: Mangifera indica

Mangifera - generic name
indica - specific epithet.

16.

(3)

Polygamous :

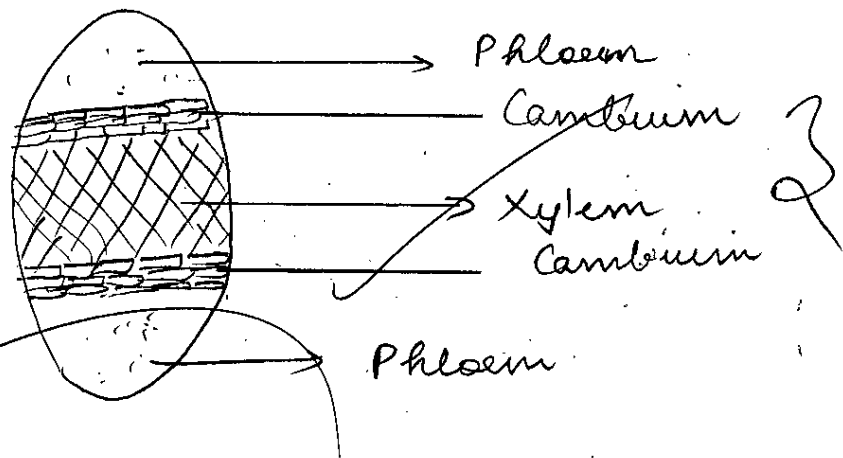
(i) Polygamous is a condition in which both male, female and bisexual flowers are present in the same flowers.

3

(ii) In Musa, both male flowers are at the top bracts, bisexual flowers in the middle bracts, and female flowers are present inside the inner whorl of bracts.

(iii) Eg: In Musa paradisiaca, the flowers are polygamous.

Bicollateral vascular bundle :



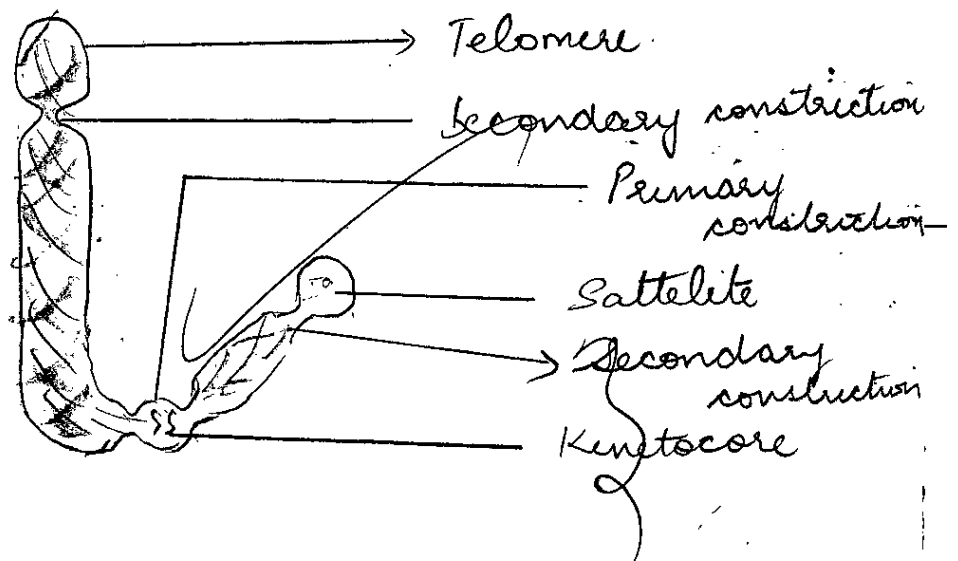
18. Passage cells :

(i) The cells of endodermis, opposite to protoxylem points lack casparyan thickening are called Passage cells.

(ii) Casparian thickening is made of suberin in the radial and tangential walls of the endodermis to prevent passage of water from cortex to endodermis.

(iii) But passage cells lack this thickening, and allows the passage of water and mineral salts from the cortex to the xylem tissues for transportation.

Structure of chromosomes



19.

3

3

2b. Organisms used in SCP production:

- 1) Algae : Chlorella, Spirulina
Chlamydomonas
- 2) Fungi : Volvariella, Agaricus
campestris
- 3) Bacteria : Pseudomonas

2a. Cyclic photophosphorylation

(i) It involves PS I only

(ii) Two ATP's are produced

(iii) NADP^+ is not reduced due to non-availability

Non-cyclic photophosphorylation

It involves both photosystem I and PS II

Only 1 ATP is produced

One NADP^+ is reduced to NADPH_2

SECTION - C

25.

(5) Significance of Herbarium:

- (i) It is the source of knowledge of all flora in a region or locality or a country.
- (ii) It acts as a data store in which information of plants are available.
- (iii) It provides materials for Taxonomic and Anatomical studies.
- (iv) Type specimens help in the correct identification of plants.
- (v) Typical pollen characters are well emphasised in taxonomy. Morphological characters of pollen remain unaltered even for 200 years.

(vi) It provides data for numerical taxonomy, chemotaxonomy, cytological studies, all these help in the correct identification of plants.

Because of its importance, several herbaria are established at national and international centres.

Types of meristem :

Based on position, meristems are classified into

- (i) Apical meristem
- (ii) Intercalary meristem
- (iii) Lateral meristem

Apical meristem :

(i) Apical meristem is present in the apices of shoot, root and branches.

(ii) It helps in longitudinal growth
ie increase in length of the plant.

(iii) It has 3 types of cell

(i) Protoderm

(ii) Procambium

(iii) Ground meristem

(iv) Protoderm gives rise to epidermis

(v) Procambium gives rise to
primary vascular tissues

(vi) Ground meristem gives rise to
cortex and pith.

2) Intercalary meristem.

(i) It is present in between the
nodal regions of the plant.

(ii) It is present between two
permanent tissues of the plant.

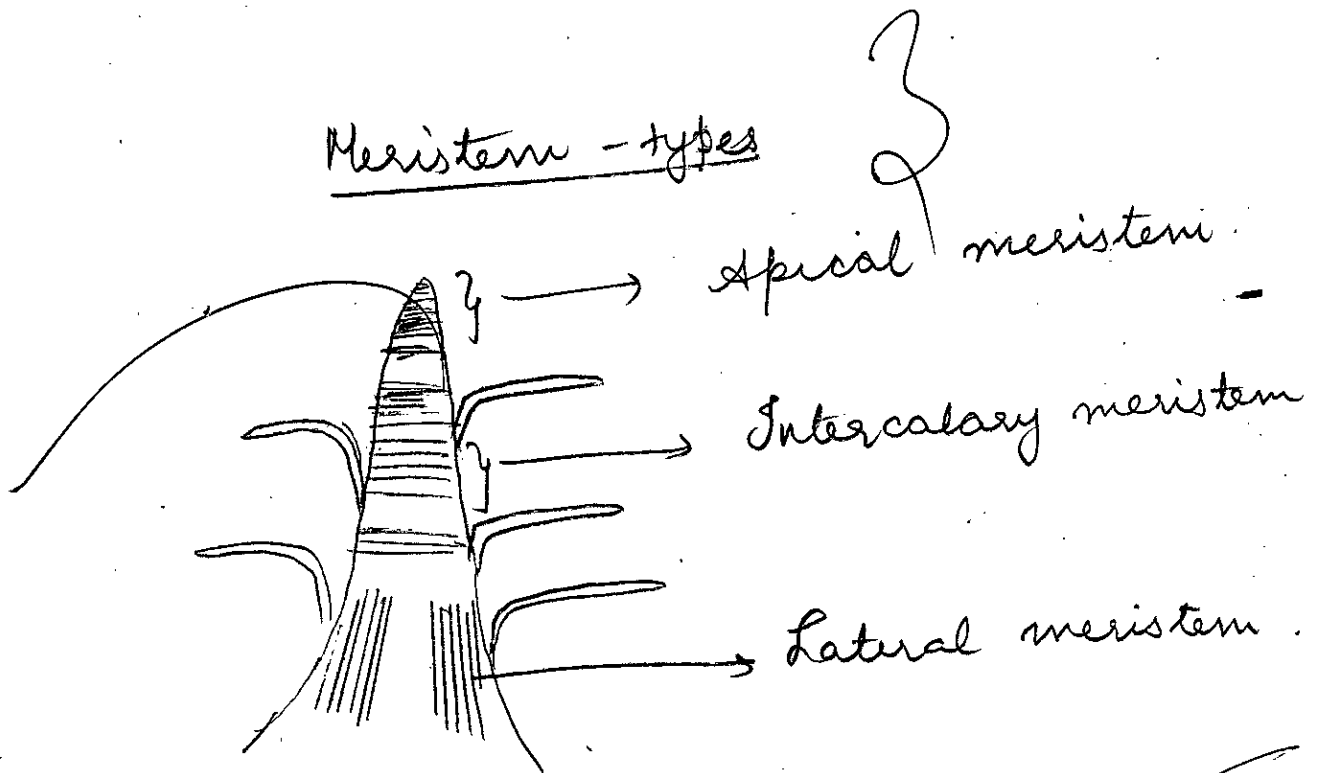
(iii) It is responsible for elongation
of internodes.

(iv) It is present in monocotyledons
eg. grasses.

3) Lateral meristem :

- (i) The meristem is present along the longitudinal axis of the plant.
- (ii) It consists of vascular cambium and cork cambium (phellogen).
- (iii) It results in increase in lateral width of the plant.

Meristem - types



29.

Ivanov's light screen experimentAim:

To demonstrate that light is essential for photosynthesis.

Procedure:

- 1) A potted plant is subjected to darkness for about 48 hours.
- 2) All the leaves become free from starch and such a plant is called destarched plant.
- 3) Ivanov's light screen is a clip like instrument, which has a star shaped opening in the centre through which light can enter.
- 4) Lower end of this is closed with box like structure.

- 5) Thus the light screen provides free ventilation and at the same times prevents light to become contact with it.
- 6) The apparatus is fixed to a leaf and fixed to a stand.
- 7) The plant is kept in sunlight for 4-6 hours.

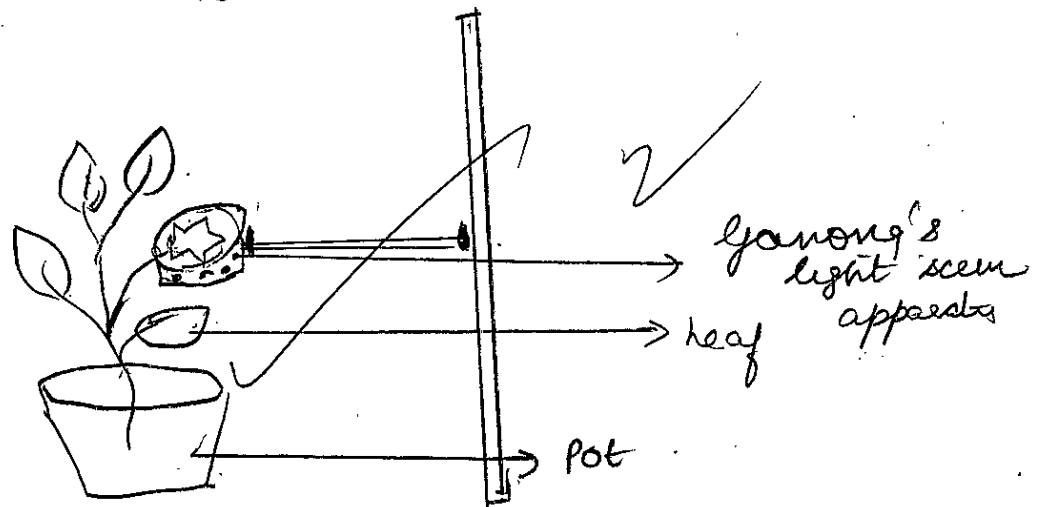
Observation:

- 1) The leaf subjected for experiment is taken and tested for the presence of starch.
- 2) It is observed that the part of the leaf exposed to sunlight, star shaped portion alone turns blue indicates presence of starch.
- 3) Other parts have no starch.

Inference:

Thus Janong's light screen experiment demonstrates light is essential for photosynthesis.

Janong's light screen



30. Physiological effects of cytokinin:

- (1) Cytokinin is responsible for cell division and cell elongation resulting in increase in number of cells and promotes growth.

- (ii) Along with IAA, cytokinin induces root and shoot formation from the callus tissue.
- (iii) It promotes the growth of lateral buds even when apical bud remains intact, on applying it.
- (iv) It breaks dormancy in many seeds and promotes germination in many seeds.
- (v) Application of cytokinin, delays the process of ageing in plants. This is called Richmond Lang Effect.

SECTION - D.

33

(10)

Dicot stem	Monocot stem
(i) Hypodermis of dicot stem is made up of <u>collenchymatous</u> cells.	Hypodermis in monocot stem is made up of <u>sclerenchymatous</u> cells.
(ii) Ground tissue is well differentiation into epidermis, cortex and pith.	Ground tissue is not differentiated but is a continuous mass of <u>parenchyma</u> cells.
(iii) <u>Starch sheath</u> is present.	<u>Starch sheath</u> is absent.
(iv) <u>Pith</u> is present.	Pith is absent.
(v) <u>Pericycle</u> is present.	Pericycle is absent.

(vi) Medullary rays are present

(vii) Bundle cap is present

(viii) Vascular bundle is open

(ix) Vascular bundle is arranged in a ring around the pith.

(x) Protoxylem lacuna is absent

(xi) Phloem parenchyma is present.

Medullary rays are absent.

Bundle sheath is present.

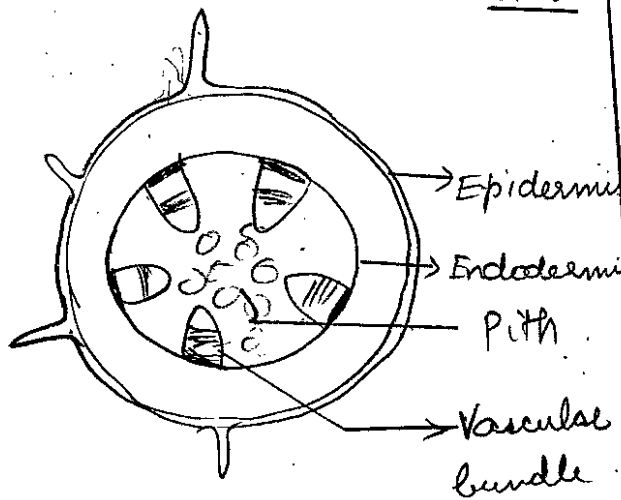
Vascular bundle is closed.

Vascular bundles are scattered in the cells.

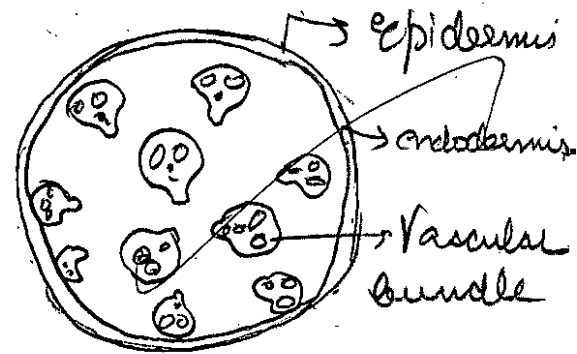
Protoxylem lacuna present.

Phloem parenchyma is absent.

Ground Plan of Dicot¹⁶ stem



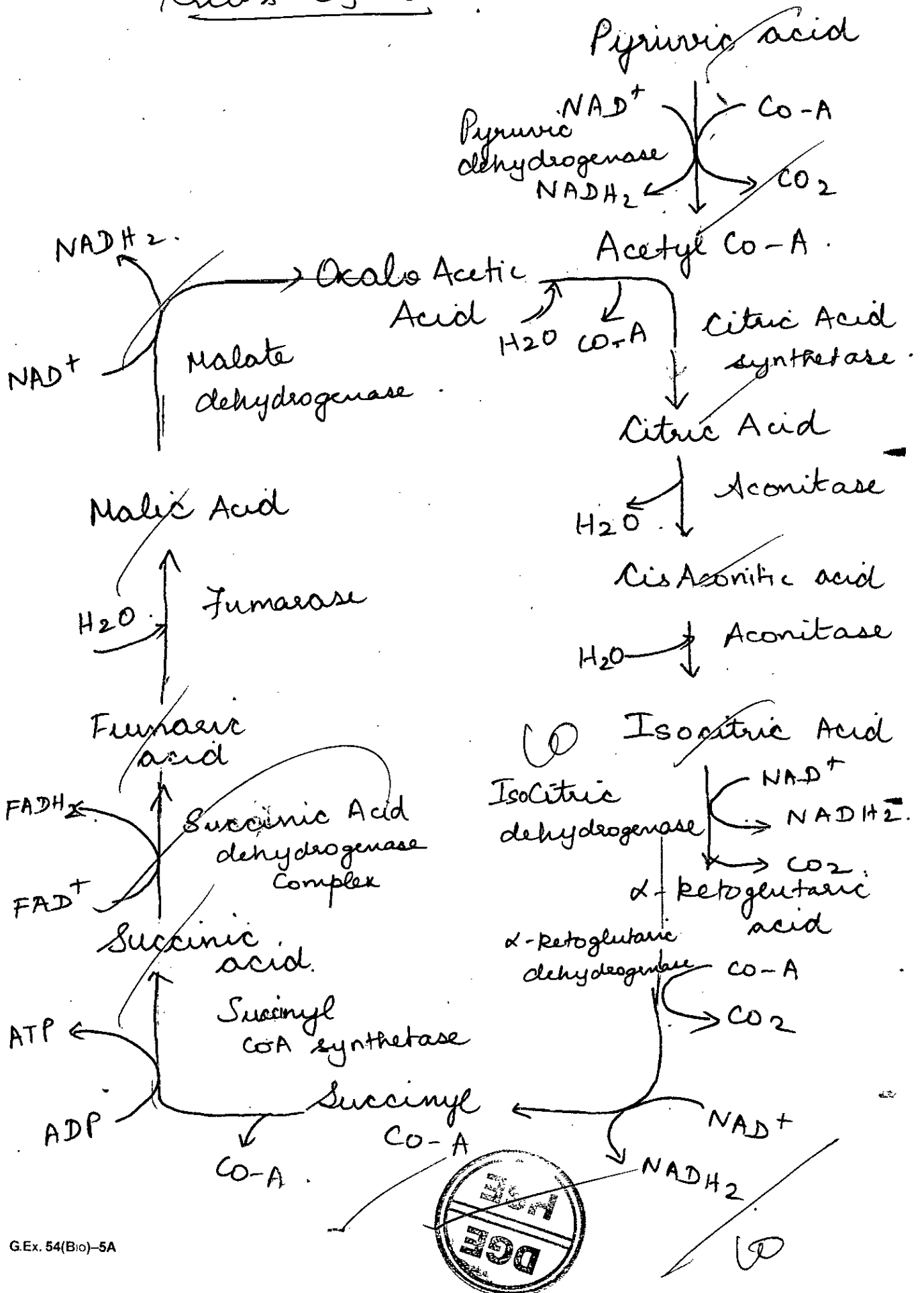
Ground Plan of Monocot stem

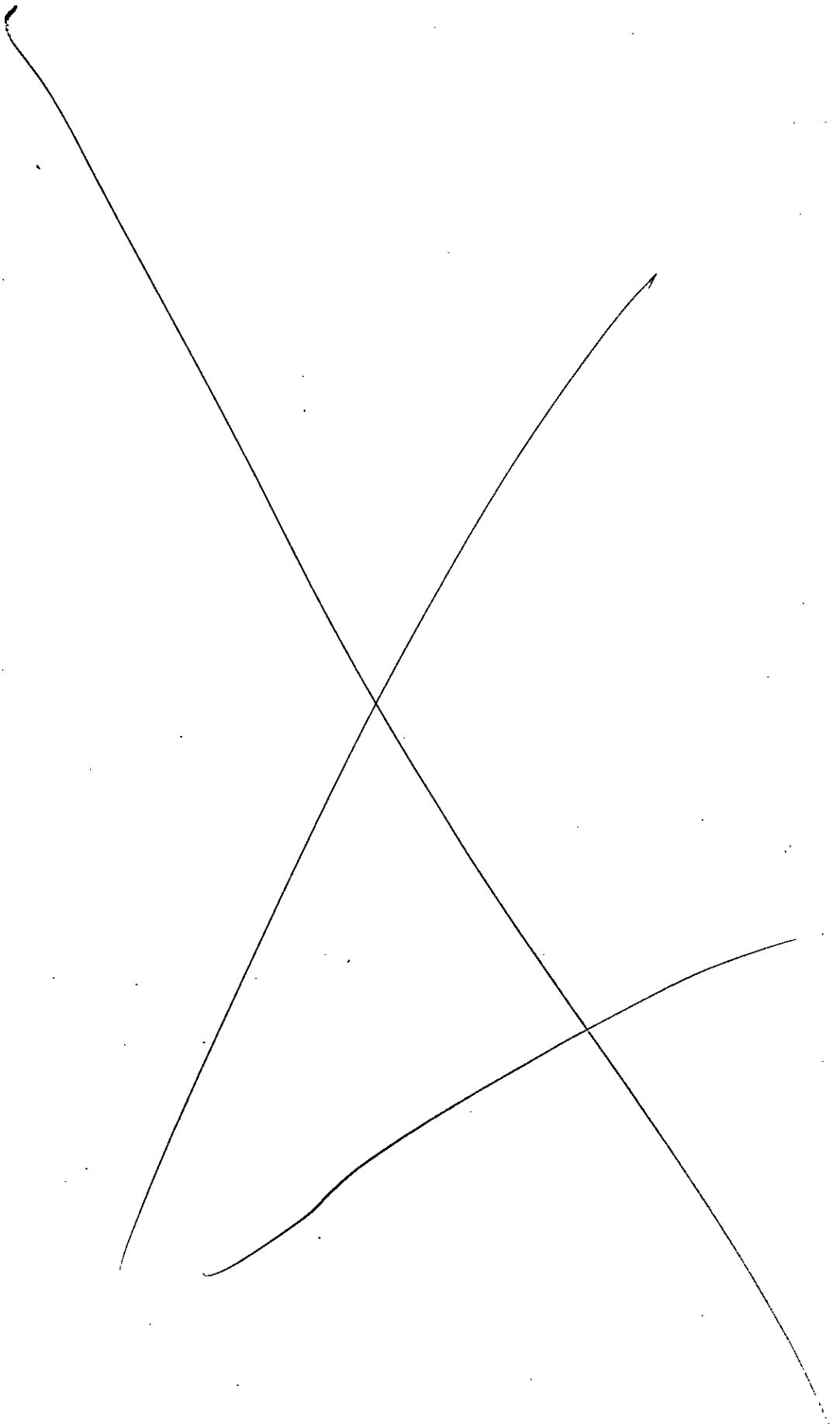


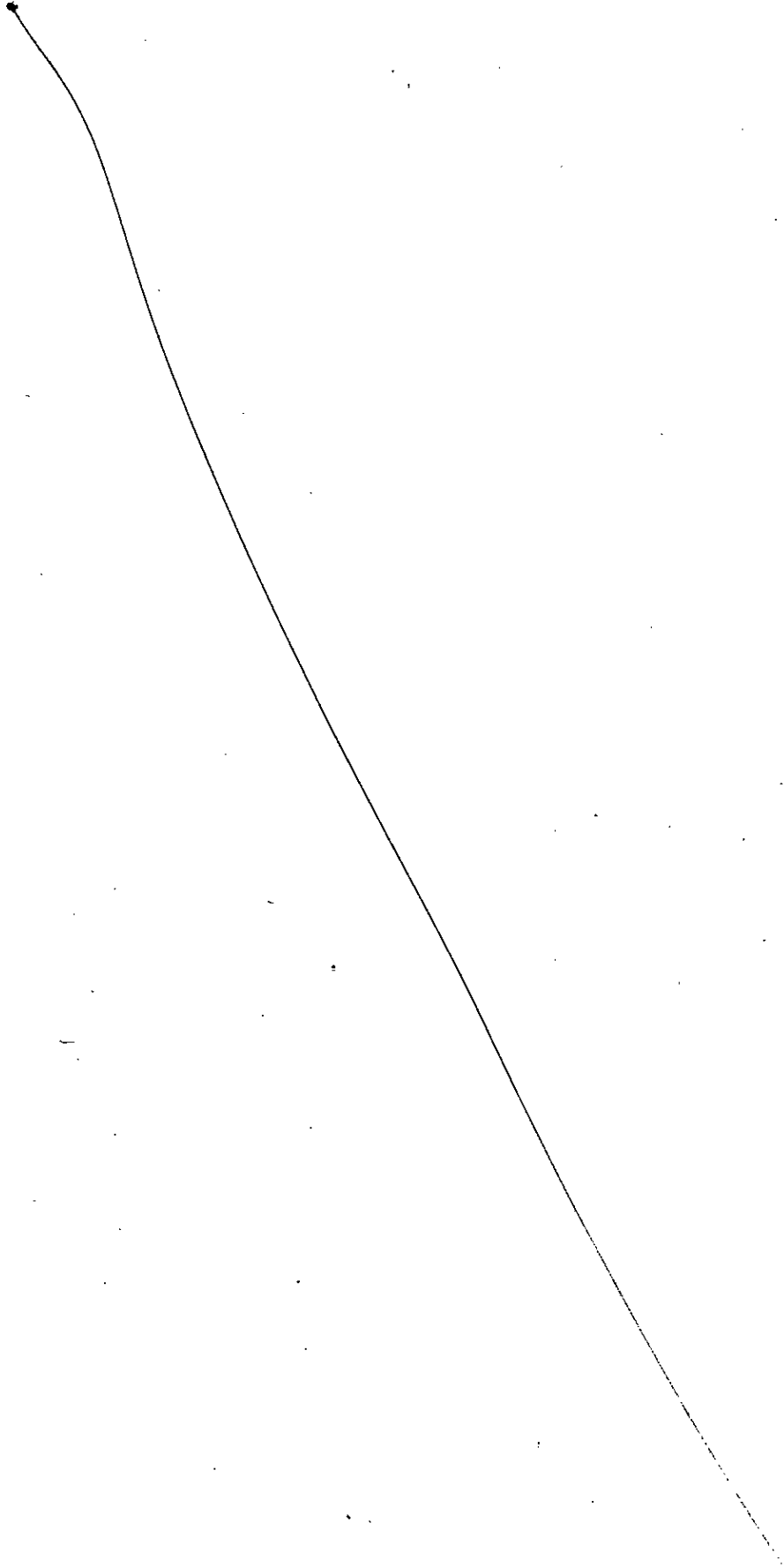
Krebs' cycle

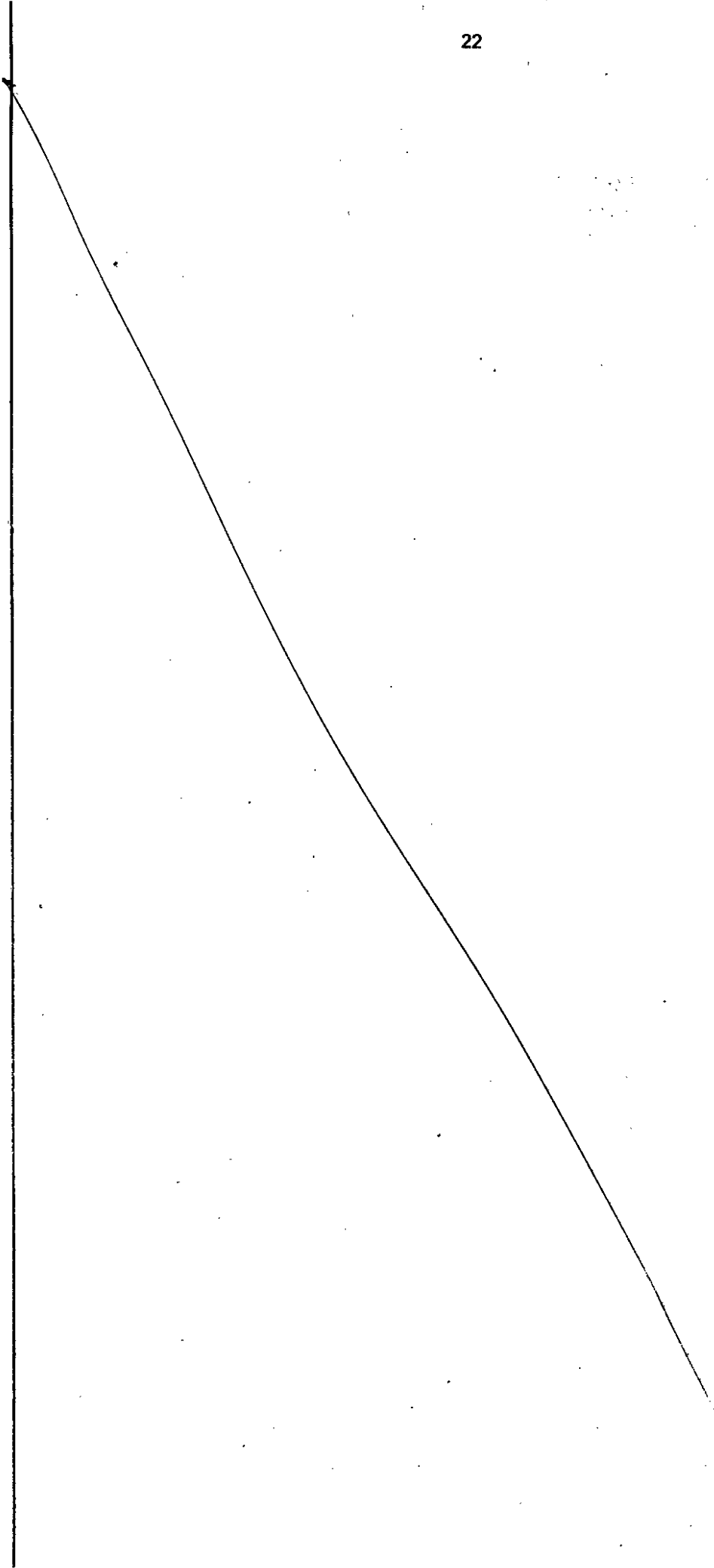
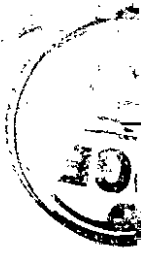
- (i) Sir Alfred Krebs discovered the Krebs cycle.
- (ii) The process by which pyruvic acid is reduced to CO₂ and water leading to enormous release of energy is called Krebs' cycle.
- (iii) It involves three carboxylic group acids and is called Tri Carboxylic Acid cycle or Citric Acid Cycle (TCA cycle).

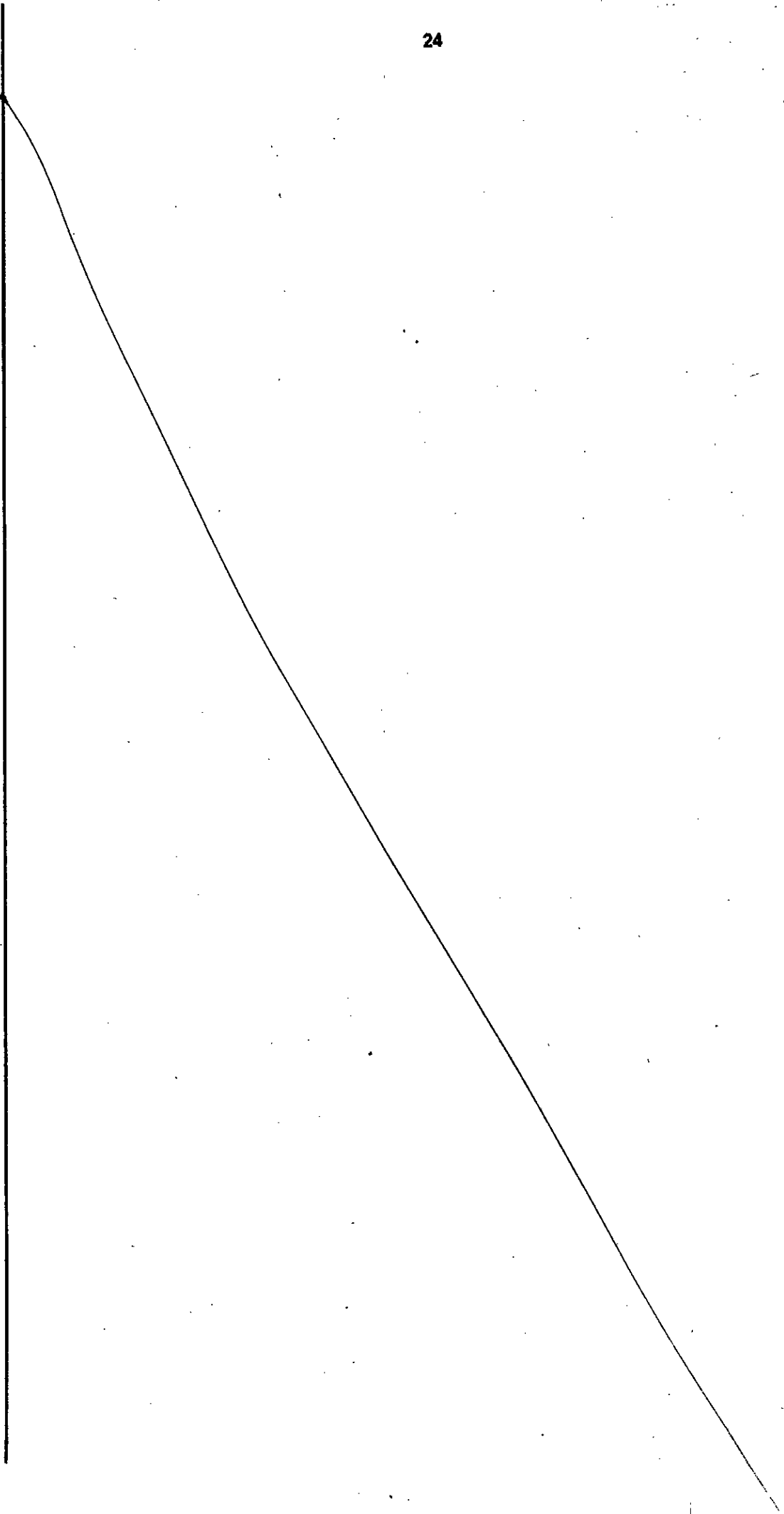
Krebs's cycle

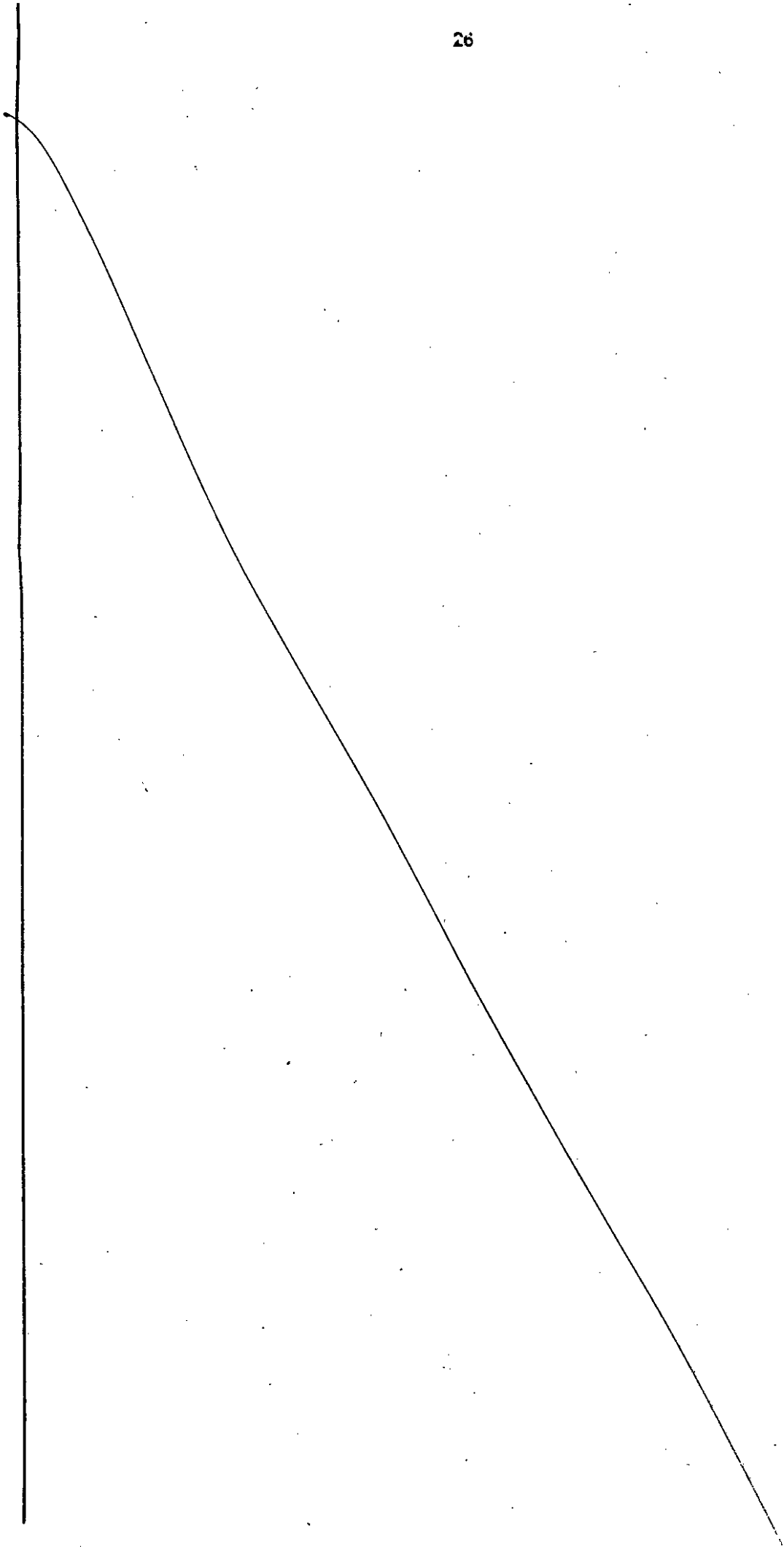












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Total Marks 73

HSE BIOLOGY

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வினாவாரியாக மொத்தம்
Question-wise Grand Total

73

பக்கவாரியாக மொத்தம்
Page-wise Grand Total

73



Do not Answer this Page

1
BIO - ZOOLOGY

SECTION - A

1. b) Parietal cells ✓ | ✓
2. c) Anthromycin ✓ | ✓
3. c) IgE ✓ | ✓
4. b) Sertoli cells ✓ | ✓
5. c) Haploid viruses ✓ | ✓
6. a) Aseel ✓ | ✓
7. b) Geothermal energy ✓ | ✓
8. b) Cholera ✓ | ✓
9. c) Lipase ✓ | ✓
10. b) Coimbatore ✓ | ✓
11. c) 295 sites in 45 countries. X0
12. b) 10 microgram ✓ | ✓

//

13. a) Fibrosis ✓² ✓
14. b) Escherichia coli ✓ ✓
15. b) Milk fever ✓ ✓
16. a) Mc. Doughall ✓ ✓

SECTION - B

17. Physiotherapy :

(1) Physiotherapy is a therapeutic exercise carried out ~~by~~ in order ~~phys~~ to make the limbs work normally.

(ii) After casting of bones, it leads to wastage of muscles and stiffness of joints.

(iv) It is carried out by physiotherapists under the guidance of orthopaedic surgeons.


- (iv) It involves splinting of resources, traction procedure, regular exercise etc.

18

Accommodation of eye :

- ③ (i) The human eye has a convex lens.
- (ii) The ability of eye lens to focus objects at varying distances is called Accommodation of Eye.
- (iii) It is carried out with the help of ciliary muscles, suspensory ligands, ciliary bodies etc.
- (iv) The eye lens can adjust itself to focus objects both for distances and nearby distances for clear vision.

Enveloped virus


(i) In these viruses, the nucleocapsid structure is,  surrounded by a thin transparent membrane called envelope.

(ii) They are soluble to lipid solvents such as ether, chloroform.

(iii) The outer envelope conceals the symmetry of viruses.

(iv) Eg: HIV is an enveloped virus.

Naked virus

These viruses have only  nucleic acid core and capsid. They don't contain outer envelope.

They are ~~not~~ soluble to lipid solvents.

The ~~symmetry~~ is not concealed.

Eg: Adeno virus, in a naked virus.

22.

Phagocytosis:

(i) The important mechanism of innate immunity is phagocytosis by the phagocytes.

(ii) It is performed by leucocytes.

(iii) In response to infection the number of phagocytes increase sharply.

(iv) Macrophages are phagocytic cells which can digest viruses, cellular debris, bacteria.

(v) At the site of infection the monocytes are converted macrophages.

(vi) This is done with the help of phagocytic enzymes and free radicals.

3 ✓

23.

Clinical manifestations of Thalassemia

- (i) Decrease in bone marrow activity.
- (ii) Peripheral haemolysis
- (iii) enlarged spleen - splenomegaly
enlarged liver - hepatomegaly

24.

Gene therapy :

(3) Gene therapy is the process of replacement of corrective gene in place of defective gene.

Two types of gene therapy

- (i) Somatic cell gene therapy
- (ii) germ line gene therapy

25

Impacts of solar energy :

- (i) Cadmium which is used as a coating in thin film solar cell is a carcinogen.
- (ii) Silicon produced from silica gives out CO_2 which increases the CO_2 concentration leading to global warming.
- (iii) It involves larger sites of solar energy plants which is a involves cutting of trees and reduces forest cover.
- (iv) Silicon dust is also harmful.

31

28.

~~Sym~~
~~Allopatric~~

8

27. Advantages of Artificial Insemination

- (3) (i) It enables the air transport of sperm over long distances and bringing new indigenous breeds.
- (ii) It enables the use of sperms from injured bulls etc.
- (iii) It eliminates the need for herd sire.
- (iv) It brings about the desirable characters in breed.

3

SECTION - C.

30. Chicken Embryo Technique:

- (i) Animal viruses can grow only in living cells. But now the technology is improved and animal viruses are cultured in laboratory
- (ii) The most economical and convenient method of culture of viruses is the Chicken Embryo Technique
- (iii) In this technique, fertile chicken eggs are taken and incubated for 5-12 days and viruses particles are inoculated into it using microinjection gene gun.
- (iv) through the outer shell of the embryo

#3

- (v) The opening may be sealed with paraffin wax.
- (vi) Virus particles multiply in the medium and producing large number of viruses.
- (vii) The different types of viruses grow in different types of cells in the embryo.
- (viii) Yolk sac medium is the ideal medium for the growth of viruses.
- (ix) Thus large different types of viruses can be cultured through chicken embryo technique.

Viruses can also be cultured through

- (i) Primary cell culture
 - (ii) Diploid cell strain
 - (iii) Continuous cell lines
-

/ O /

31.

Spleen - peripheral lymphoid organ :

(1)

(i) Spleen is one of the peripheral organ.

(2)

(ii) Spleen is the largest lymphoid organ.

(iii) It consists of red and white pulp arranged alternatively.

(iii) They contain macrophages and eliminates the microorganism invading by killing them.

(iv) The function of spleen are,

Function of spleen:

- (i) Spleen as a graveyard (effete) for the effete (aged) red blood cells.
- (ii) It acts as a reservoir and settling bed for blood.
- (iii) It acts as a systemic filter and kills the microorganisms that are in the circulating lymphocytes and blood.

Uses of DNA Recombinant Technology:

32. (i) The study of DNA Recombinant technology helps the geneticists to understand the structure of eukaryotic genes and their components.

4

(ii) ~~It acts as a~~

(ii) Through Recombinant DNA technology, certain life saving drugs such as ~~hormones~~, vitamins, can be produced such as Human growth Hormones, Somatostatin etc.

(iii) Through genetic engineering gene type of plants can be altered. So ^{new} transgenic plants which are resistant to diseases and pests have been produced.

(iv) It helps in removing genetic defects in plants and animals by somatic gene therapy and germ line gene therapy.

(V) Genetically modified bacteria are called super bugs. These are capable of ~~killing~~ degrading several hydrocarbons at same time. They can digest crude oil spills in ocean. They help in Pollution abatement. The first superbug was produced by an Indian researcher Anand Chakrabarty called Pseudomonas strain in USA. It is capable of cleaning oil spills in ocean. It can degrade octanes, xylene camphors and toluenes.

SECTION - D

35. Methods of Birth Control Techniques

(10) (i) The population is rising it was only in ^{few} million before some years. At present the population is about 100 million or 10 crores.

(ii) So it is necessary that we adopt methods to control birth.

(iii) The government has adopted measures like

(i) Child and ~~maternity~~ health care.

(ii) Women and Child Care

(iii) National Conservation strategies.

/D/

The various methods of birth control are

- (i) Barrier methods
- (ii) Hormonal methods
- (iii) ~~Insertional~~ Intrauterine methods
- (iv) Surgical methods

I Barrier methods :

1) Condom :

(i) Barrier method involves the use of condom by men and cervical caps by women.

(ii) Condom is a large elastic rubber tube like which can exactly fit into the penis worn by men.

(iii) It prevents the deposition of sperms in the vagina.

(iii) Condoms are made of natural rubber or plastic.

✓✓✓

(iv) Condoms can be used along with spermicides to kill the sperms.

(v) The sperms are contained inside the condom preventing the entry of sperms into vagina.



(i) Condom

(ii) Vagina (or) Cervical cap ✓✓

(i) In females, can wear vaginal cap or cervical cap fitting to vagina or cervix

(ii) It prevents the entry of sperms into the uterus preventing fertilisation.

(iii) Vaginal / Cervical cap is made up of synthetic plastic ✓

✓ 2 ✓✓

II Hormonal Methods

- (i) In this method, 'pills' are used
- (ii) Pills usually contain 'progestin' which is a female type hormone.
- (iii) It contains oestrogen & progesterone
- (iv) So, it prevents ovulation and stops the mechanism.
- (v) It thickens the endometrium preventing fertilisation.
- (vi) It also ~~th~~ leads to formation of mucus which ~~also~~ prevents fertilisation in the uterus.
- (vii) Hormonal methods are nearly 99% effective.

III Instrumental methods:

- i) Instrumental devices such as Intrauterine devices (IUD) or Intrauterine system can be inserted.
- (ii) Copper-T is a T shaped device inserted into the uterus. It prevents fertilisation and prevents birth control.
- (iii) It gives sufficient type interval between pregnancies.
- (iv) It is for 3 years it is used effectively.

IV Surgical method:

- (i) Vasectomy
- (ii) Tubectomy.

(i) Vasectomy :

(i) It is the type of permanent birth control in male where the portions of vas deferens is cut off and ligations are performed

(iii) It is not effective immediately since, the seminal vesicles still contain sperms.

(iv) Tubectomy :

It is the permanent birth control in female where portions of fallopian tube is cutt off and ligations are performed.

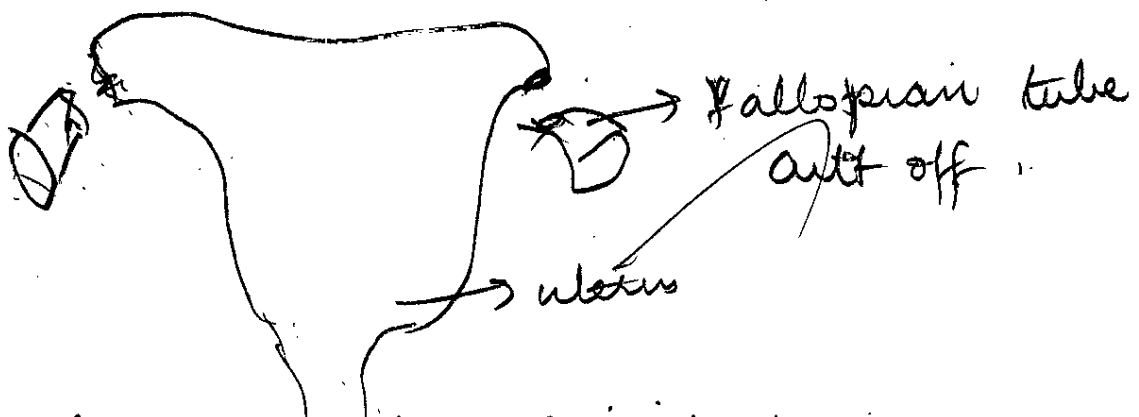
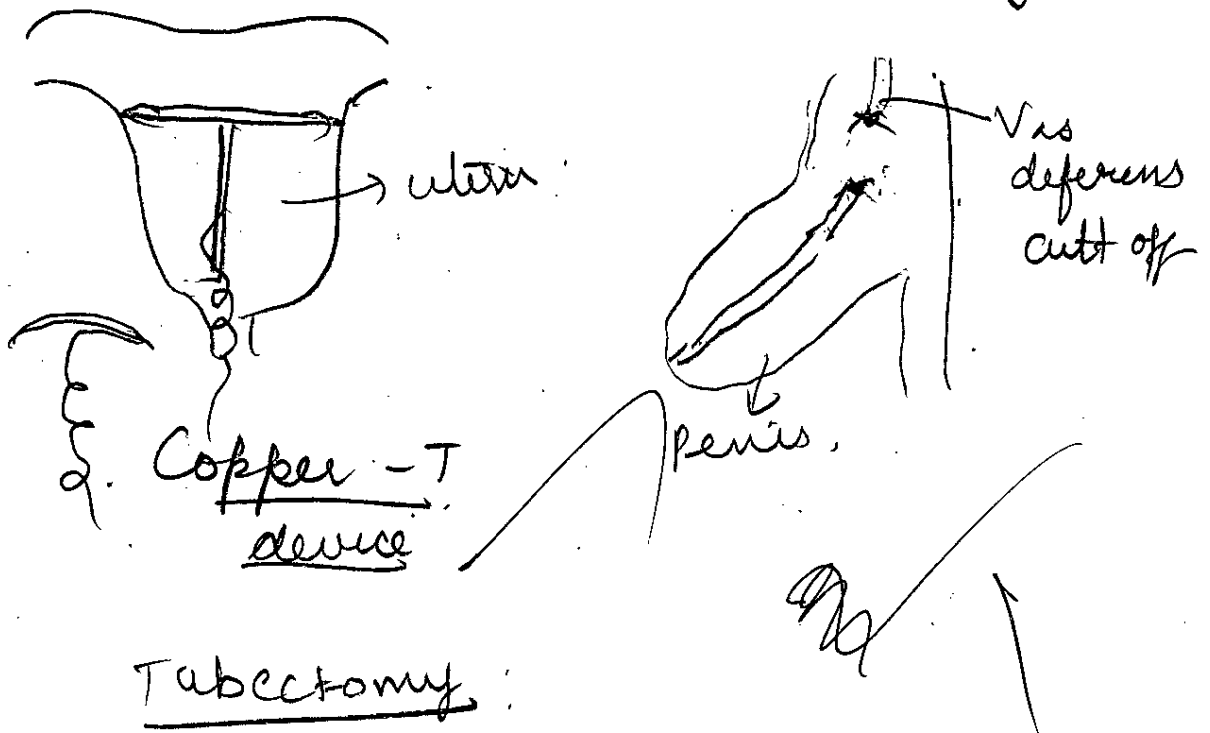
(ii) It is effective immediately but the risk of ectopic pregnancy is increased.

✓✓

Copper-T :

22

Vasectomy :



3.6

Fresh water crisis :

Fresh water is limited in the earth. So measures are taken to increase fresh water.

- (i) Seeding clouds
- (ii) Desalination
- (iii) Dams, Reservoirs, aquifers.
- (iv) Rain water Harvesting
- (v) Wet lands Irrigation
- (v) Better Agricultural practices
- (vi) Industrial conservation
- (vii) Domestic conservation
- (viii) Individual Role

(i) Seeding clouds :

- (i) Seeding clouds with dry ice (or) potassium iodide particles can sometimes initiate rain if water laden clouds and conditions that favour precipitation are present.

(ii) Desalination :

- (i) Desalination of ocean water has great potential for increasing fresh water.
- (ii) It includes method of distillation (evaporation and recondensation)

or reverse osmosis (passing water into semi permeable membrane)

(III) It is costly but used in countries like Dubai, oman and Bahrain

(II) Dams, Aquifers and canals:

(i) Dams can trap of run off water and increase fresh water supplies.

(ii) Dams, aquifers, reservoirs, canals can be water transported to other areas.

(iv) Wet Land Irrigation:

Through wet land Irrigation, small dams can be built, using low cost, low labour and with high efficiency.

They increase fresh water supplies
provide stock watering facilities
and wild life activities :

(V) Rain Water Harvesting :

(i) Rain water Harvesting is the method
of trapping run off water and
recharging into ground for future
use.

(ii) It is done with help of canals.

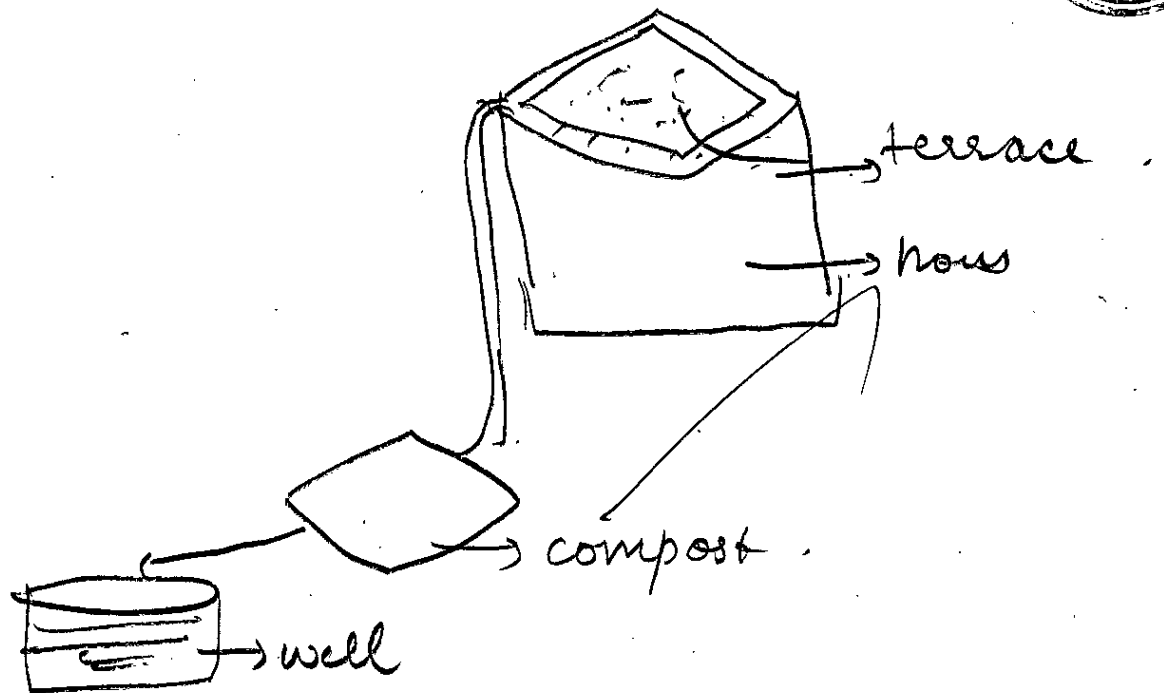
(iii) It increases ground water level
and reduces sea water intrusion.

(iv) It is the trapping of rain water
~~from the~~ in wells and aquifers.

(v) Tamil Nadu leads the India
Rain water Harvesting

(vi) It has made it mandatory
for all houses, buildings
etc.

Rain water Harvesting



(vi) Better Agricultural practices :

(i) Agricultural practices like forest, trap, and steep cut of slopes.

(ii) Runn off water in steep slopes is prevented.

(iii) Forest resources should not be destroyed.

அரசுத் தேர்வுகள்

கூடுதல் விடைத்தாள்

பதிவு எண்.....

(vi) Domestic Conservation

About $\frac{1}{2}$ of water that we use can be conserved without much sacrifice like use

- (i) low shower baths
- (ii) dish washers
- (iii) washing machines

(vii) Industrial conservation

(i) waste water from industries should be discharged after treatment.

(ii) The water after cooling the appliances is lead to rivers, so it should be checked and released after treatment of water.

(viii) Individual Role :

- 1) Checking taps for leaks
- 2) Using low flush toilets,
- 3) Using recycled water for lawns.
- 4) Using xerotypic land scaping in gardens.
- 5) Taking low shower baths.

